

January, 1917, a very interesting series of 8 days toward the close of the month, on the Schatzalp (above Davos) gave the type of aqueous exchange under the régime of a calm winter anticyclone. During the night, by reason of the considerable fall in temperature of the snowy surface, a slight condensation intervened (e. g., night of Jan. 22-23, a mean of 0.007 mm. per hour); but from sunrise to sunset a many times larger amount evaporated (e. g., on Jan. 23=0.036 mm. per hour).

On the other hand I have determined persistent condensation on the Saint-Gothard during the summer weather of May, 1917, a period when—during the warmest hours—there was equilibrium between the vapor pressure of the air and of the snow bed, but where condensation always prevailed when this did not obtain; the maximum was 0.110 mm. per hour in the night of May 25-26 and during a strong north wind. Of course, the special conditions in the col (high wind with accentuated vertical component) increased the condensation as compared with other stations.

The complete observations will be published and discussed elsewhere.

551.58

USE OF MONTHLY MEAN VALUES IN CLIMATOLOGICAL ANALYSIS.

By E. G. BILHAM.

(Abstract of paper presented before the Royal Meteorological Society, London, Dec. 19, 1917.)

[Reprinted from *Nature*, London, Dec. 27, 1917, 100: 340.]

The objects of the paper are (1) to determine to what extent computations based on calendar monthly mean values are vitiated by the fact that the latter are of unequal length; and (2) to provide means of applying numerical corrections on account of errors arising from this cause.

The mean month is defined as an exact one-twelfth division of the year, or 30.437 days, and that period is used as the standard to which the results derived from the actual months are reduced. The matter is of special interest in connection with the computation of Fourier coefficients to represent the seasonal variations of a meteorological element such as temperature. Regarding the year as a cycle of 360°, errors arise from the fact that the monthly mean values will in general differ by small amounts from the ordinates of the curve corresponding with 15°, 45°, etc. The corrections to be applied to the original monthly means and to the Fourier amplitudes have been determined. The use of these corrections is suggested as an alternative to the employment of 5-day means in cases where special accuracy is required.

551.508.5

BATHYRHEOMETER AS ANEMOMETER.

Y. Delage describes in the *Comptes Rendus* of the French Academy of Sciences,¹ experiments looking toward the adaptation of his bathy-rheometer to the purposes of the anemometer. The bathy-rheometer consists essentially of a staff about a meter in length carrying at its upper free end two metal plates mutually perpendicular and of areas sufficient to perform the work expected of them; while the lower end of the staff is attached to a gimbal support, is heavily counterweighted, and probably will be provided with a damping device to counteract the tendency of the staff to vibrate in the rare atmos-

phere under the influence of wind puffs. One of the two metal plates or fins acts as the tail of a windvane, being attached by one edge longitudinally to the top of the staff. The fin perpendicular to the vane-fin is set at an angle of 45° with the axis of and sloping upward away from the staff. Its reaction against the horizontal or inclined air currents tends to depress the staff to a definite amount depending on the velocity of the wind. The orientation and the amount of depression of the staff are recorded by suitable mechanisms linked to the counterweight.

M. Delage designed this instrument to measure and record aqueous motions associated with wave phenomena, and was led to apply it to anemometry by the suggestion of Bayeux who thinks that the device is better adapted to anemometric work in high localities than the usual windmill type of instrument, which frequently loads up with rime and glaze until it can not function. It would seem, however, that the adapted bathy-rheometer is equally liable to give false indications, though some kind of a record will undoubtedly be secured. It is the experience of the Weather Bureau that the tails of the standard windvane, equally with the cup arms of the Robinson anemometer, are subject to loading up heavily with rime and glaze under certain American weather conditions. This would certainly happen to the fins of the bathy-rheometer also, under such weather conditions, thereby giving a temporary "set" to the staff with its overhanging fins, and certainly modifying temporarily the fundamental angle of inclination of the inclined fin.

Furthermore, Delage himself has recently found and, to a certain extent, discussed² another source of error inherent to the instrument whether immersed in water or air, viz, vortex movements which are intensified in the stronger currents and cause an erratic registration. On the records by the instrument "these abnormalities appear as parasitic curves which are hard to distinguish" and a mechanism for reducing the disturbing vortex movements has not yet been perfected.

In the first of the two papers cited the author describes and illustrates the meteorological application of his device and works out some formulæ for interpreting its records.—C. A., jr.

NITRITES FROM NITRATES BY SUNLIGHT.³

By Prof. B. MOORE.

(Abstract of paper presented before the Royal Society, London, Dec. 13, 1917.)

[Reprinted from *Nature*, London, Dec. 27, 1917, 100: 338.]

Dilute solutions of nitrates exposed either to sunlight or to a source of light rich in light-energy of short wavelength (such as light from a mercury vapor arc inclosed in silica) undergo conversion of nitrate into nitrite. There is an uptake of chemical energy in this reaction transformed from light energy, as in the formation of organic carbon compounds in foliage leaves; it is to be added to the relatively small number of endothermic reactions induced by light. When green leaves are immersed in nitrate solution comparatively little nitrite accumulates, indicating that nitrites are rapidly absorbed by the green leaf. Nitrates taken up by plants from soil would, in presence of sunlight, be changed to nitrites, which are much more reactive than nitrates. This indicates that the early stages of synthesis of nitro-

¹ Delage, Y., in *Comptes rendus*, Paris, Aug. 27, 1917, 165: 277-283.

² Moore, B. The formation of nitrites from nitrates in aqueous solution, by the action of sunlight and the assimilation of the nitrites by green leaves in sunlight.

³ Delage, Yves. Utilisation du bathyrhéomètre pour l'anémométrie dans les régions froides. *Comptes Rendus*, Paris, 12. nov. 1917, 165, 659-666.

genous compounds are carried out in the green leaf and aided by sunlight. Rain-water collected for a considerable time contains no nitrites, all having been oxidized to nitrates; but if exposed to bright sunlight or ultra-violet light for a few hours a strong reaction for nitrites is always obtained.

There is no hydrogen peroxide or ozone in air at surface level. The fresh odor in open air, commonly referred to as "ozone," is probably nitrogen trioxide, which at high dilutions has the odor of ozone. The oxides of nitrogen are probably formed by the action of sunlight, rich in ultra-violet rays, in upper regions of the atmosphere upon air and aqueous vapor.

CENTENNIAL OF METEOROLOGICAL STATION AT THE GRAND SAINT-BERNARD.¹

By R. GAUTIER.

[Abstract of paper presented to Swiss Society of Geophysics, etc., Zurich, Sept. 11, 1917.]

On the occasion of the centennial of the installation of a meteorological station at the Hospice of the Grand Saint-Bernard by Marc-Auguste Pictet, September 15, 1817, the director of the Observatory of Geneva, Mons. R. Gautier, proposed to the general assembly of the Société Helvétique des Sciences Naturelles that there be transmitted to the canons of the Grand Saint-Bernard, a memorial bearing a large number of signatures of members of the society.

In this connection Mons. Gautier made some remarks concerning the installation, and the gradual improvement of the station in 1829 by Auguste de la Rive, afterward several renewals by Émile Plantamour in 1883, by Émile Gautier, and finally in 1900, 1903, 1916, and 1917, by himself.

In 1900 the station was transferred from the old building to the new one, and since that time the observing hours—which had been following the changes in effect at the Geneva Observatory—have been fixed at the three official terms for all the Swiss meteorological réseau.

Interesting climatological results are given in Ch. Bühner's note "Le Climat du Grand St.-Bernard" (Lausanne, 1911), and in the splendid monograph "Das Klima der Schweiz" by Maurer & Bilwiler. There is in preparation at the Geneva Observatory, a work on the whole 100 years of observations.

TIME-ZONES AT SEA.

[From the report of the Council of the Royal Society of Great Britain, as abstracted in Nature, London, Dec. 6, 1917, p. 275.]

The possibility of introducing a more convenient system of timekeeping at sea has lately been under consideration, both in Great Britain and in France. The conclusions reached at a conference under the chairmanship of the Hydrographer to the Admiralty, in which representatives of scientific societies took part, are included in the report of the council. The most practical method of obtaining uniformity is considered to be the establishment, outside territorial waters, of zones corresponding with the hourly zones on land. It is proposed that the zone extending from $7\frac{1}{2}^{\circ}$ east to $7\frac{1}{2}^{\circ}$ west of Greenwich should be the zero zone, and that the other zones west

and east should be respectively described as *plus* or *minus*, with an indication of the actual correction required for reduction to Greenwich time and date. On this system "+12" would be the half-zone east of the "date line" and "-12" the half-zone west. Any alteration of the time of clocks in ships should always be one hour, but the instant of making the change need not necessarily be that of passing to a new zone. In the case of self-recording meteorological instruments, which it would be difficult to adjust for changing zone time, Greenwich time is considered most convenient, but ship's time should be used for the regular observations. If the proposed zone times be generally adopted, it is recommended that the receipt and dispatch of telegraphic and other messages should for the immediate future be recorded in zone time; but, eventually, it would be most convenient for such purposes to adopt Greenwich time throughout the world.

Baron Dairoku Kikuchi, 1855-1917.

By Dr. T. C. MENDENHALL.

[Dated: Ravenna, Ohio, Jan. 14, 1918.]

Baron Dairoku Kikuchi, one of Japan's most distinguished educators and men of science, whose death occurred in August last, was so well known in America, not only through his published works but also personally, that something more than a formal obituary note will doubtless be welcomed by readers of the MONTHLY WEATHER REVIEW.

Dr. Baron Dairoku Kikuchi, privy councilor, president of the Imperial Academy, honorary professor of the Imperial University at Tokyo and also of the Imperial University at Kyoto, was born on March 17, 1855, in the city of Yedo, now Tokyo. Both his father and grandfather were noted scholars in their day, especially in the, to them, greatly restricted area of human knowledge known to the Japanese as "Western learning."

The system of heirship by adoption and change of name, so long in use in Japan, gives rise to much confusion among foreigners regarding relationship and many men of science in Europe and America who have known and admired both Kikuchi, minister of education, mathematician and author of many works, and Mitsukuri, eminent zoologist and writer of international reputation, have not known or suspected that they were brothers. Kikuchi's father was Shuhei Mitsukuri, who had been adopted by Gempo Mitsukuri as his heir. He had belonged to the house of Kikuchi, and to this name his son Dairoku succeeded when it was vacated by his father. Dr. Kakichi Mitsukuri, the distinguished naturalist, was a younger brother and bore the name of the father.

In his early boyhood Kikuchi was famed for his precocity, and it is said that at the age of 9 years he was "a teacher of others." In 1866 the old Shogunate Government sent to England a number of promising young men, who were to absorb the best, if possible, of that Western learning and culture which was already pounding heavily at the closed portals of Japan. Many of these afterward rose to distinction and the youngest of them all was Dairoku Kikuchi, 11 years of age. In two years he returned to his native land, when again, at the mature (?) age of 13 years, he engaged in teaching. At the same time he was a most industrious student, and two years later he was ordered back to Europe to complete his studies. In the University of London, and afterward at Cambridge, he distinguished himself. He was one of the "wranglers" of the latter, of the year 1877, a group of

¹ R. Gautier (Genève). Le Centenaire du Grand St-Bernard. Arch. des sci. phys. et nat., Genève, 15. Nov. 1917, 44: 361.